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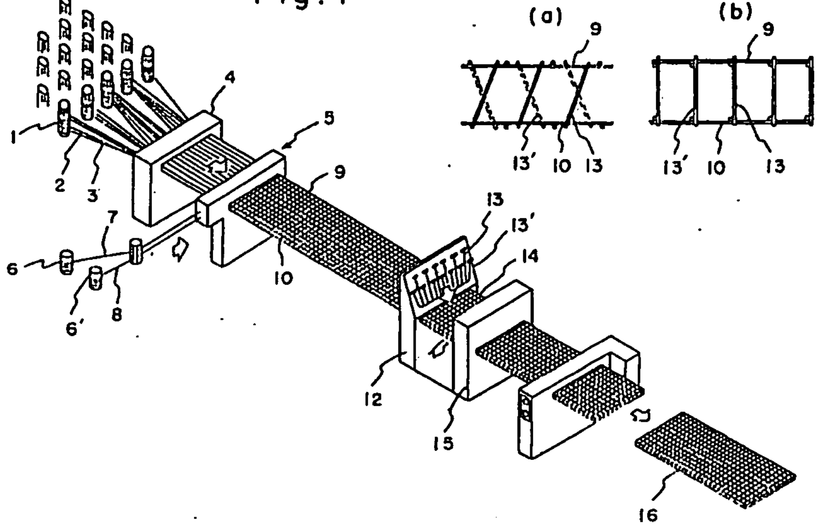
(54) Wire mesh truss for wall panels

(57) Upper and lower layers 2,3 of wire are paid out continuously and made into wire meshes 9,10, which are integrated by joining them by support ribs 13,13' while a predetermined spacing is maintained between the two layers. The support ribs are either inclined in mutually opposing directions Fig. 2a, or have their locations staggered in turn, alternately in a direction orthogonal to the longitudinal direction of the wire meshes Fig. 2b. After the resultant solid wire mesh truss is cut to a predetermined length 16, the truss is embedded to a predetermined depth in mortar which fills a molding frame to a prescribed depth; mortar is allowed to cure and harden, the truss with the mortar is removed from the mold and the opposite side of wire mesh truss is provided with mortar in the same manner, thereby sandwiching the truss between the two layers of mortar. Thereafter, a core is inserted to fill the space between the two mortar layers, thereby constructing a light-weight panel.

A material such as glass wool having good sound absorbing property and fire-resistance property may be sandwiched between two light-weight panels Fig. 20 and mortar is sprayed onto a joint portion at the construction site to joint mutually adjacent ones of the light-weight panels, thus completing a dividing wall.

Fig. 1



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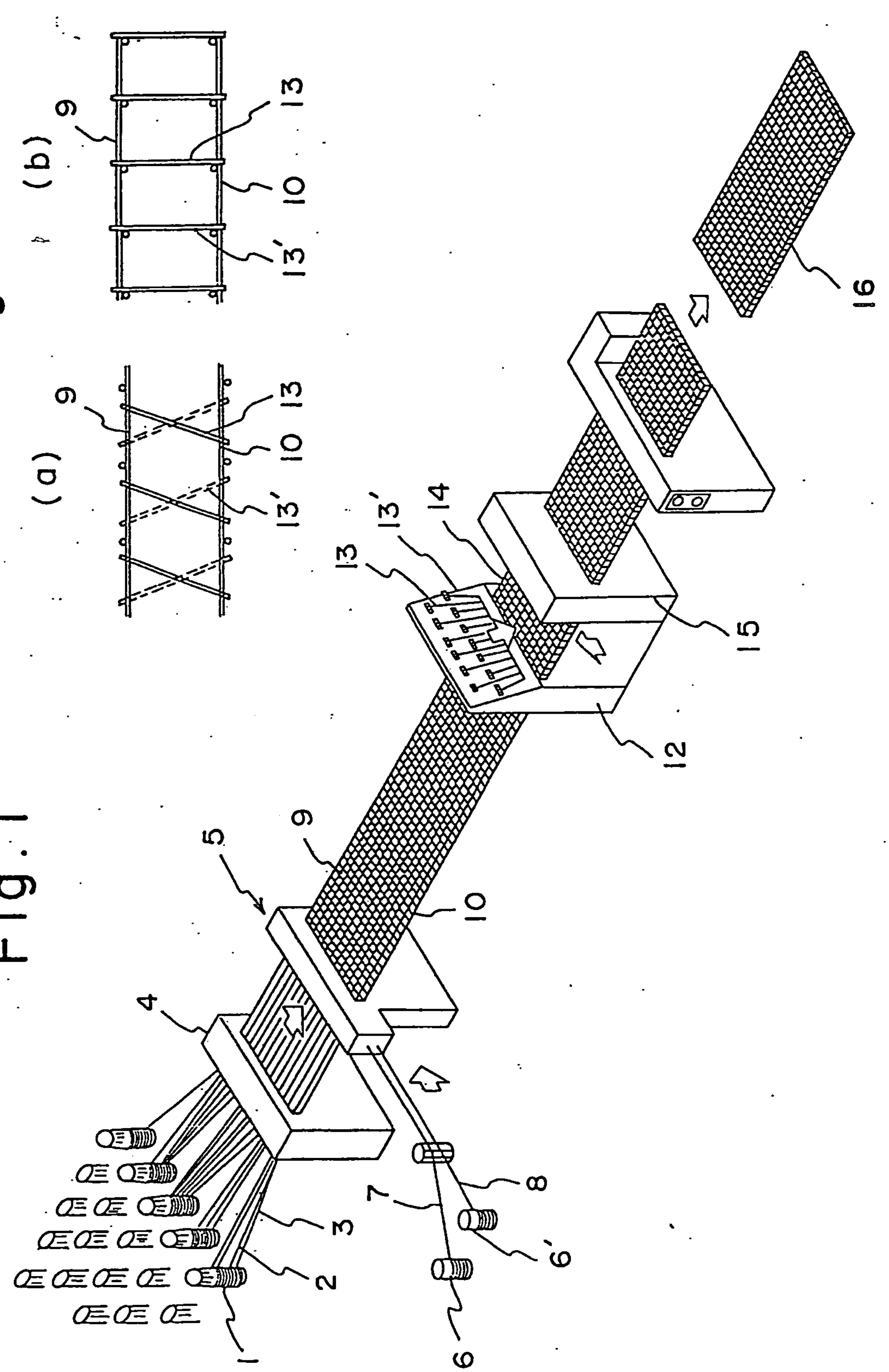

Fig. 2

Fig. 1

Fig. 3

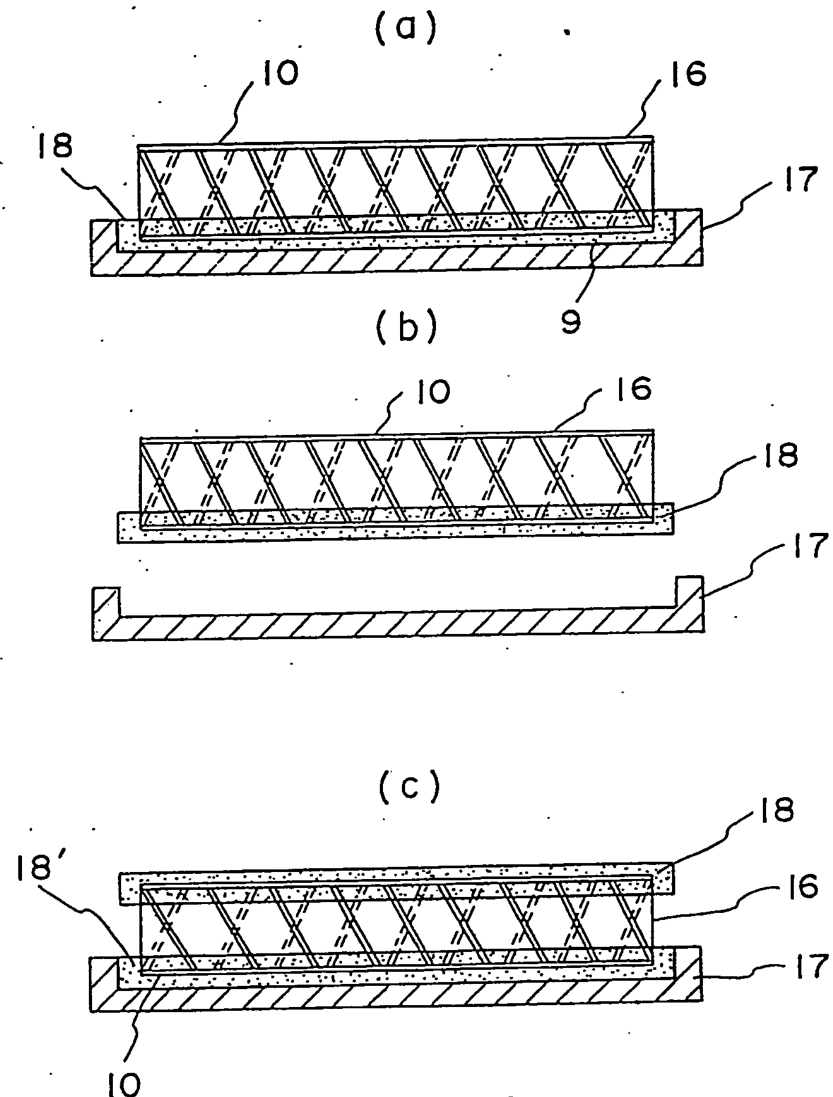

Fig. 4

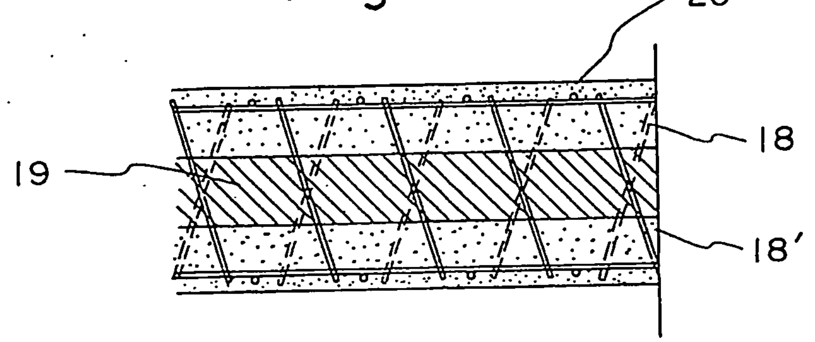

Fig. 5

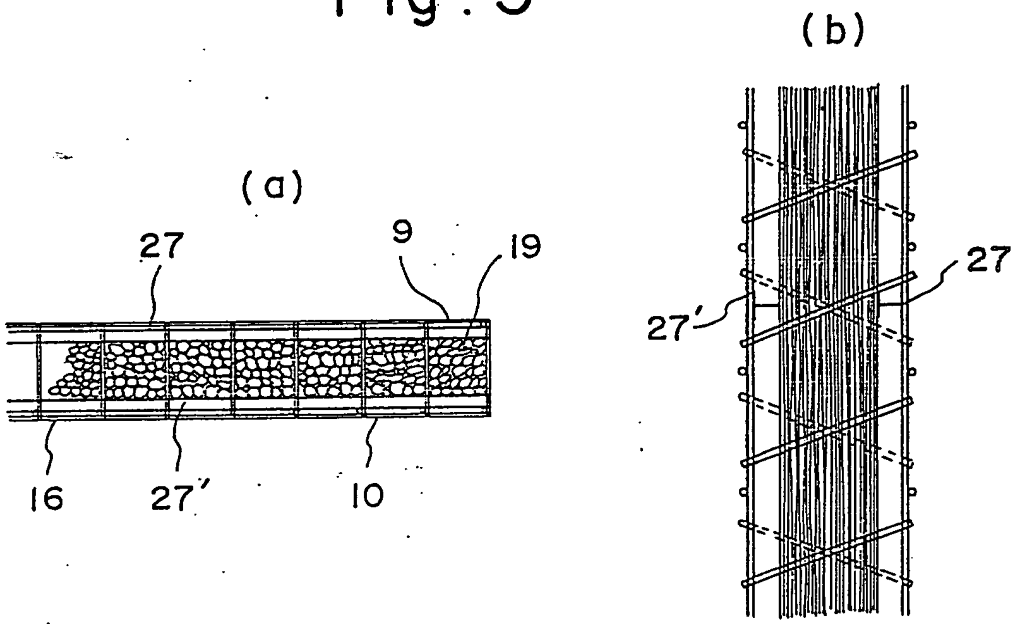

Fig. 6

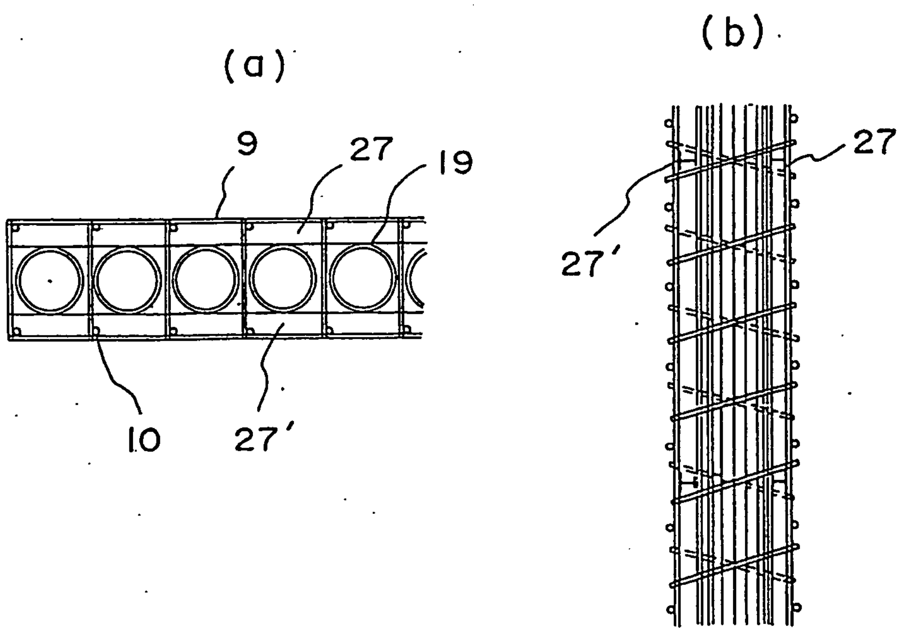

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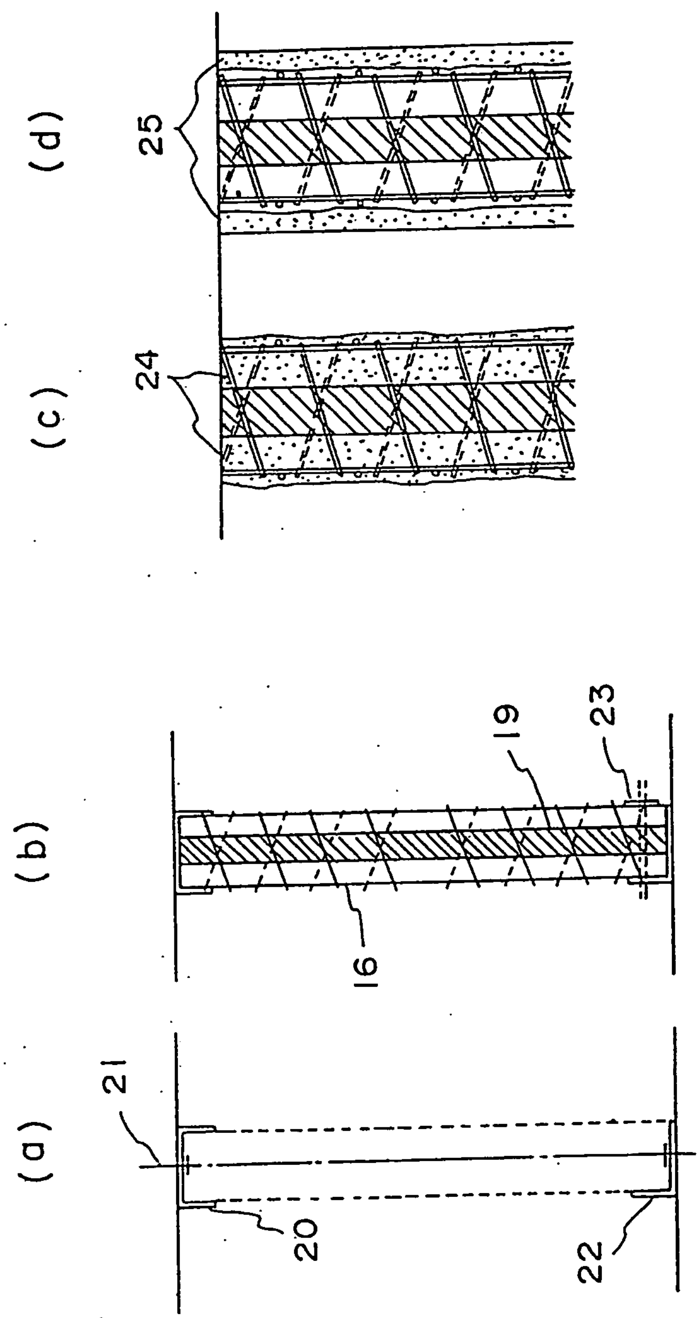
Fig. 7



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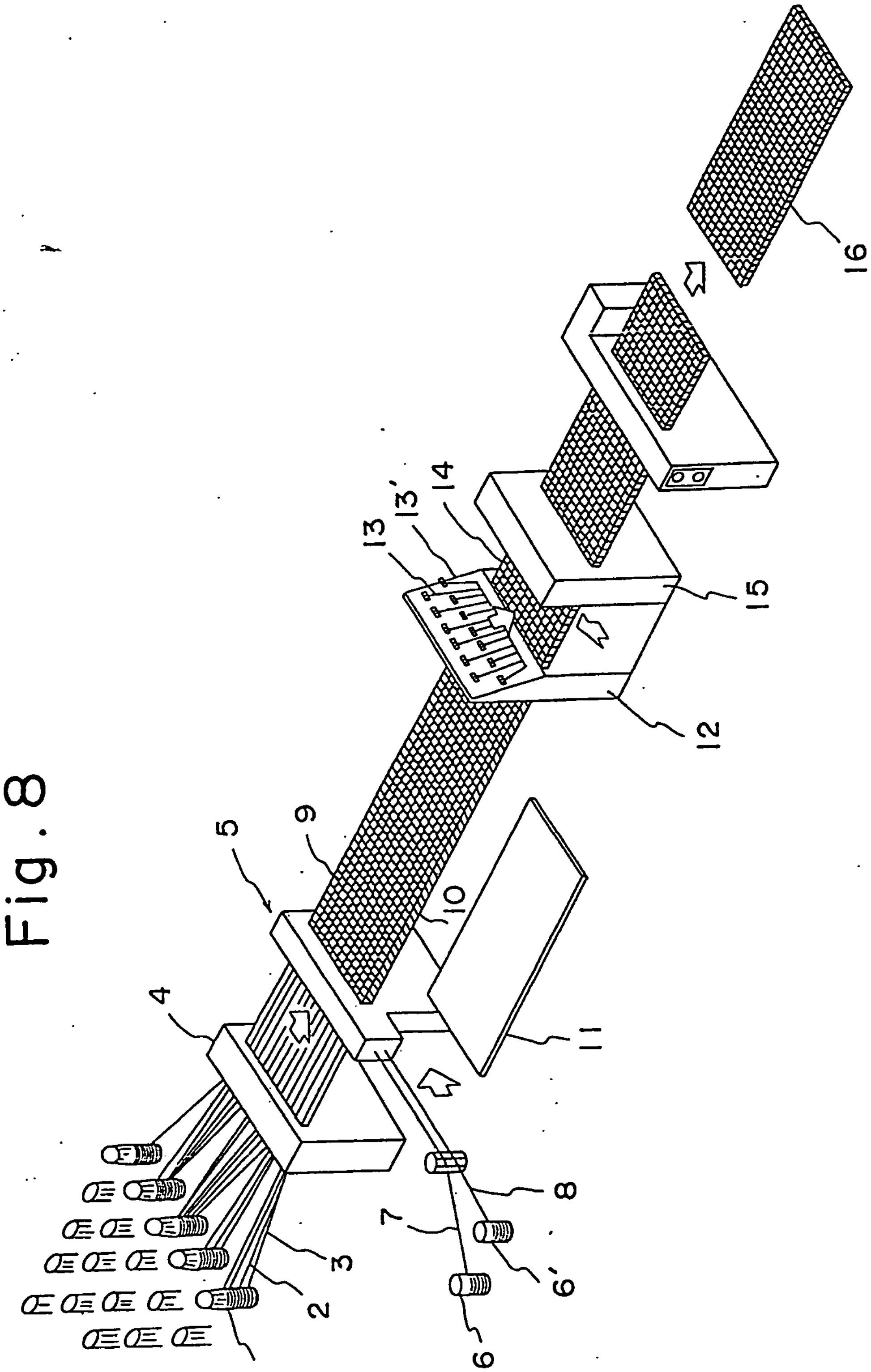

Fig. 8

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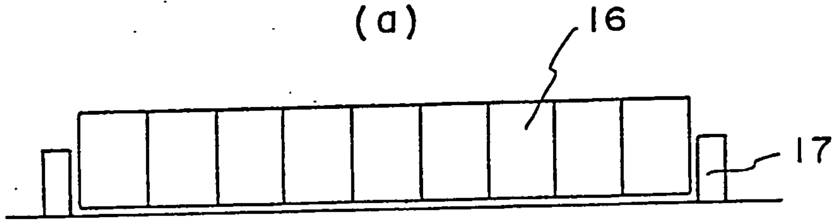
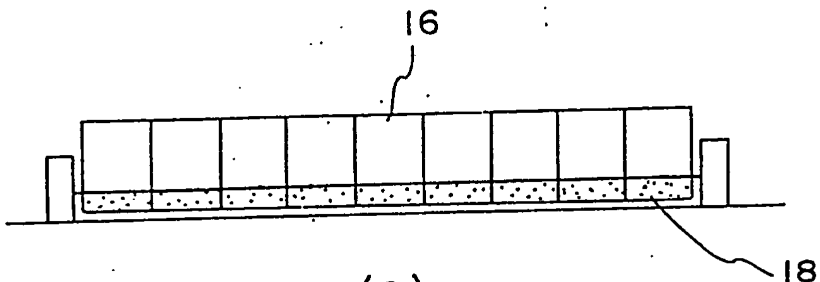
Fig. 9

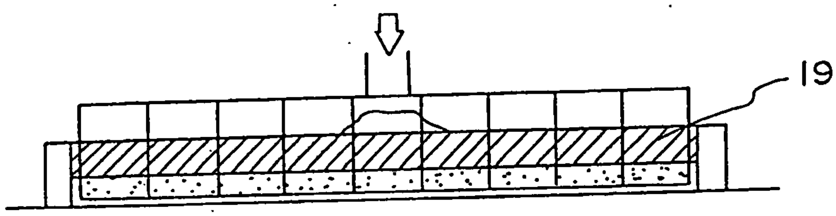
(a)



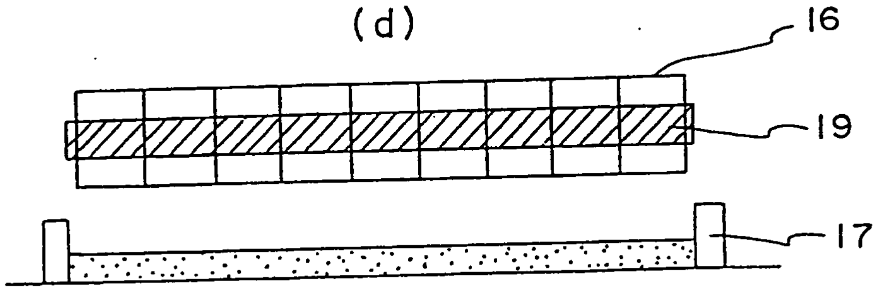
(b)



(c)



(d)



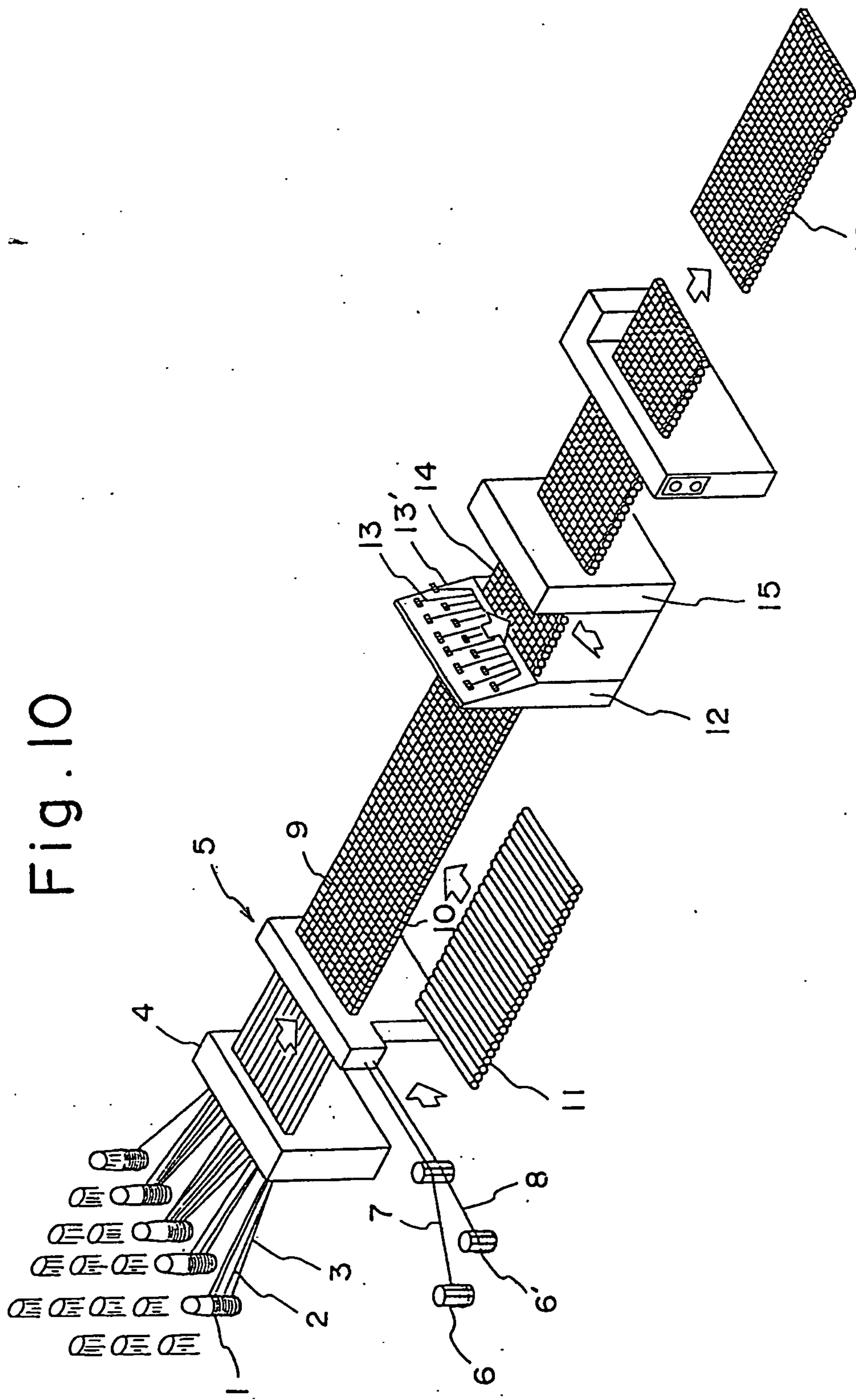


Fig.10

Fig. 11

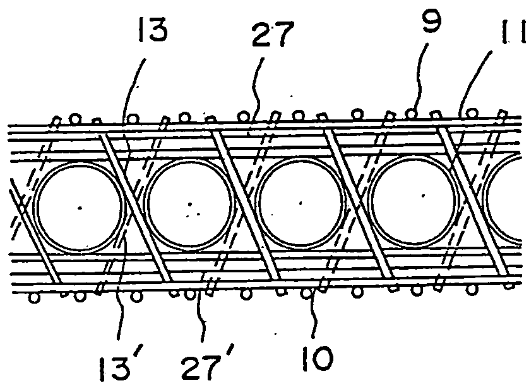


Fig. 12

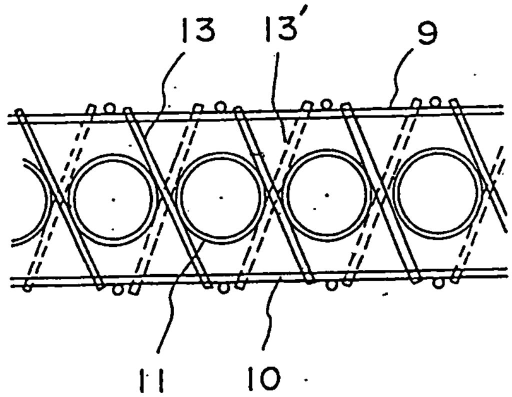


Fig.14

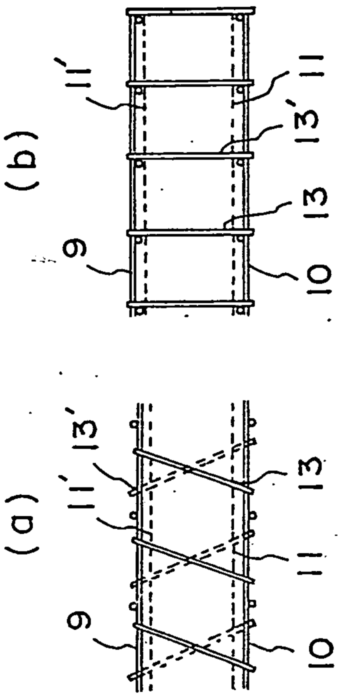
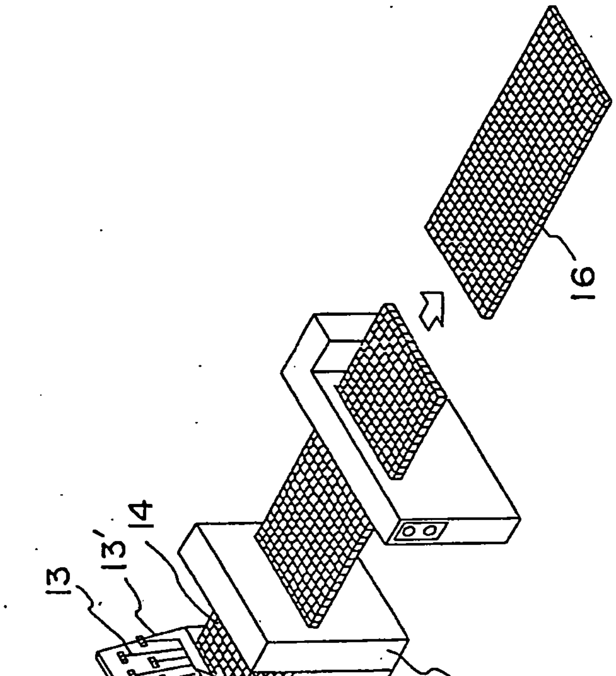


Fig.13



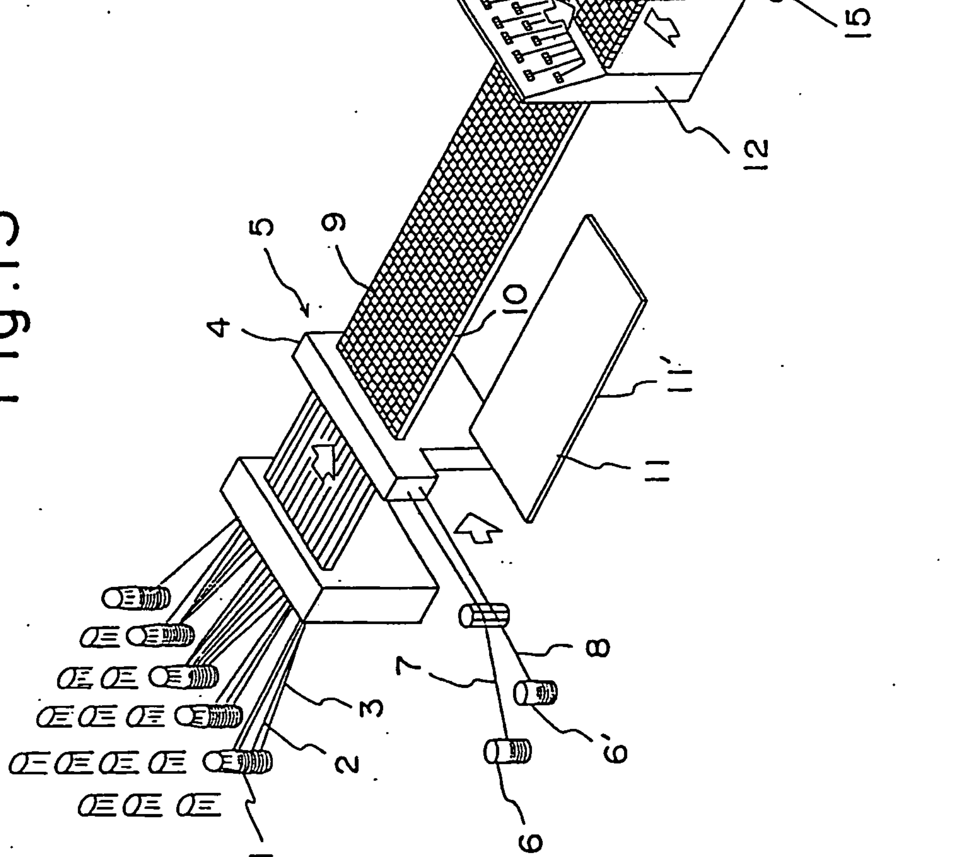


Fig.15

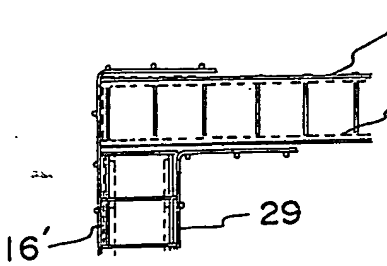


Fig.16

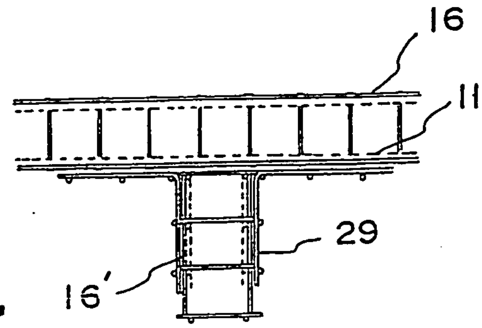


Fig.17

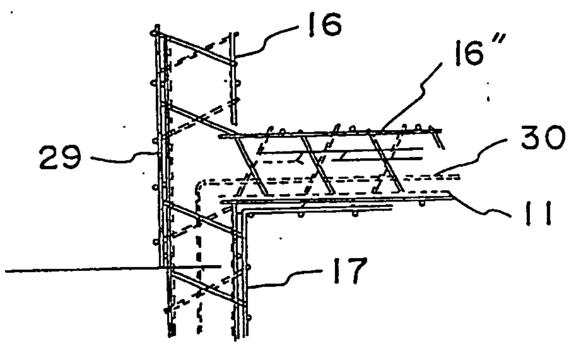


Fig.18

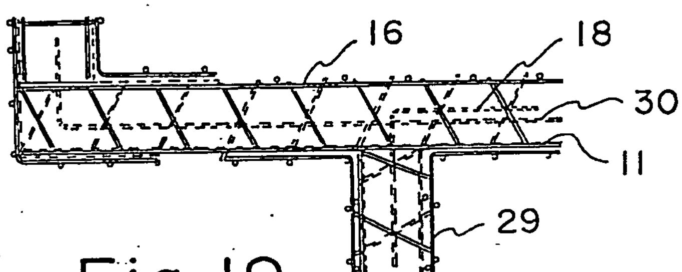


Fig.19

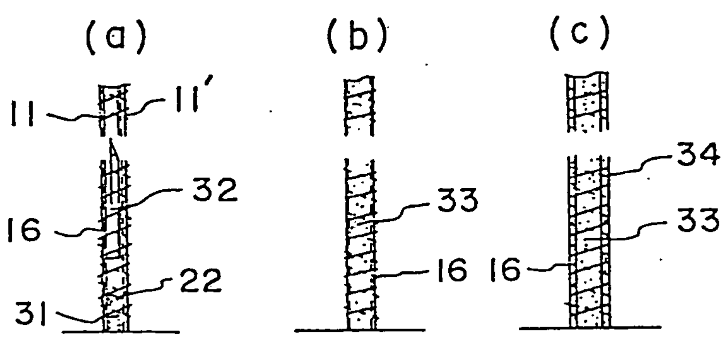


Fig. 20

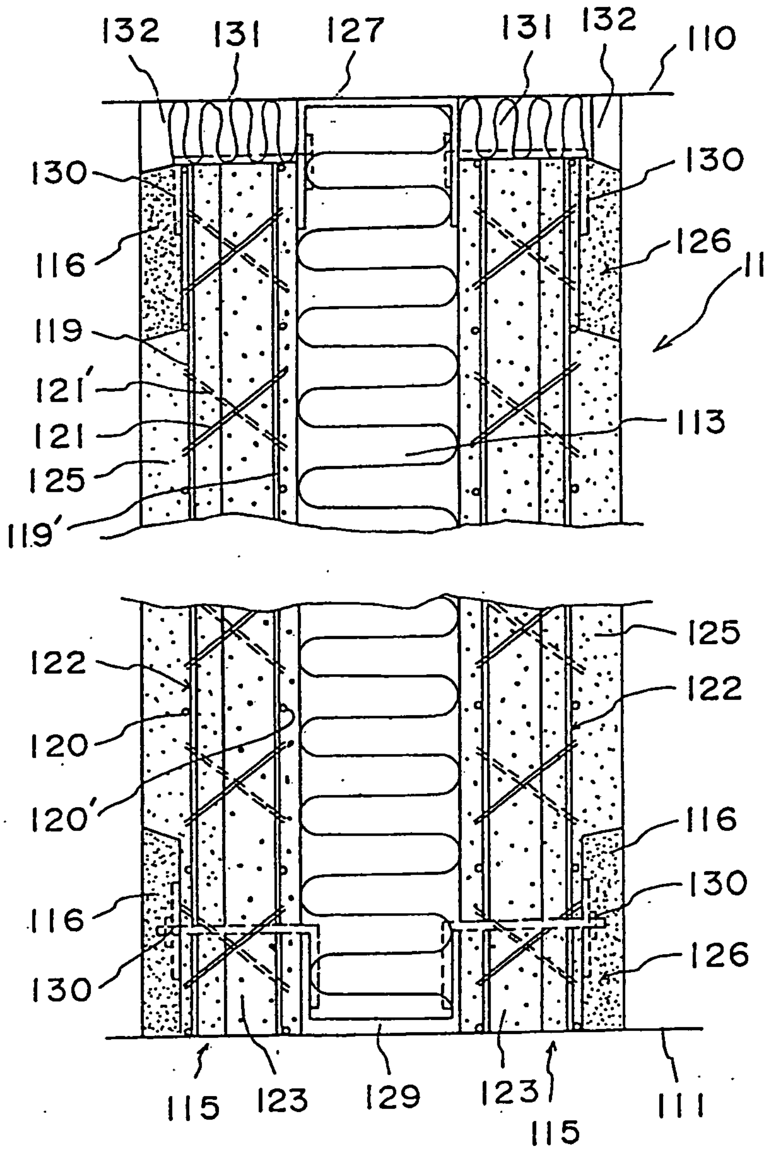

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Fig. 21

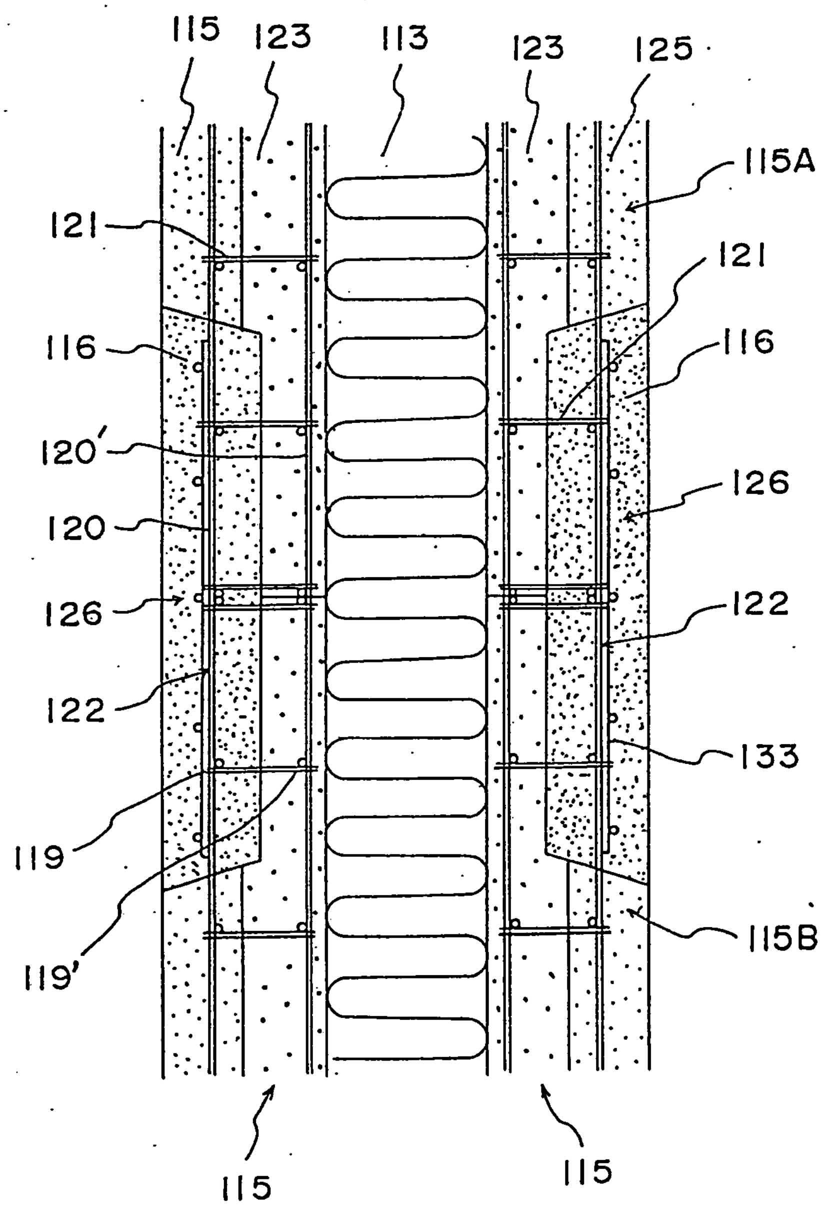

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Fig. 22

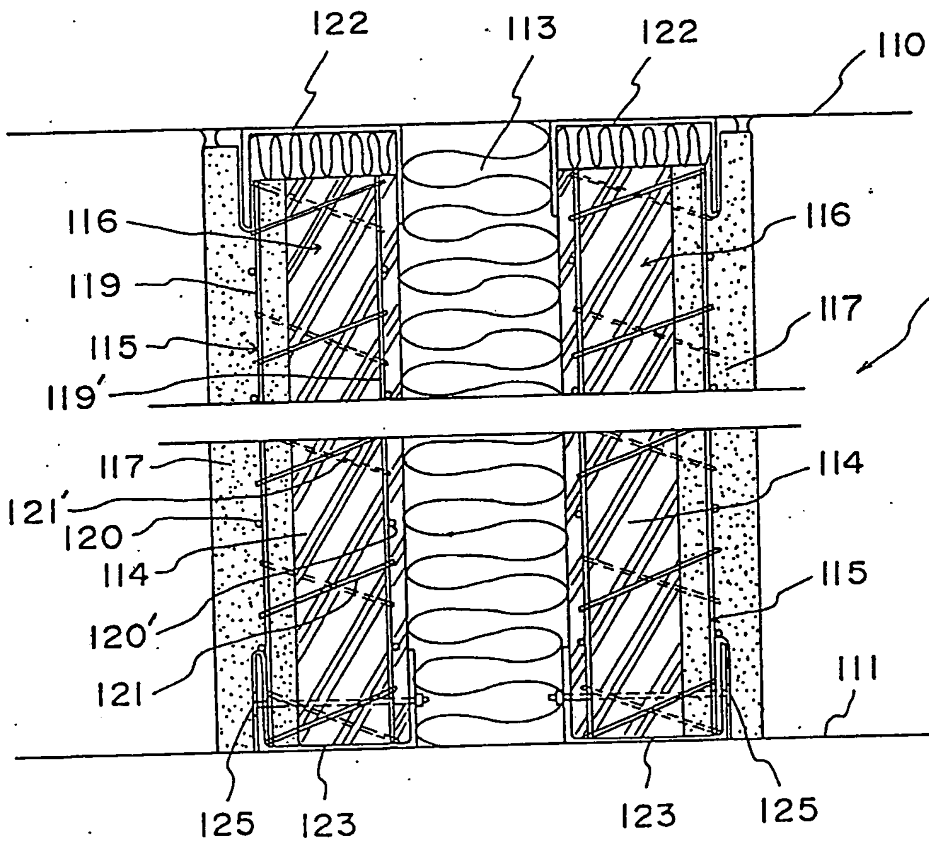

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Fig. 23

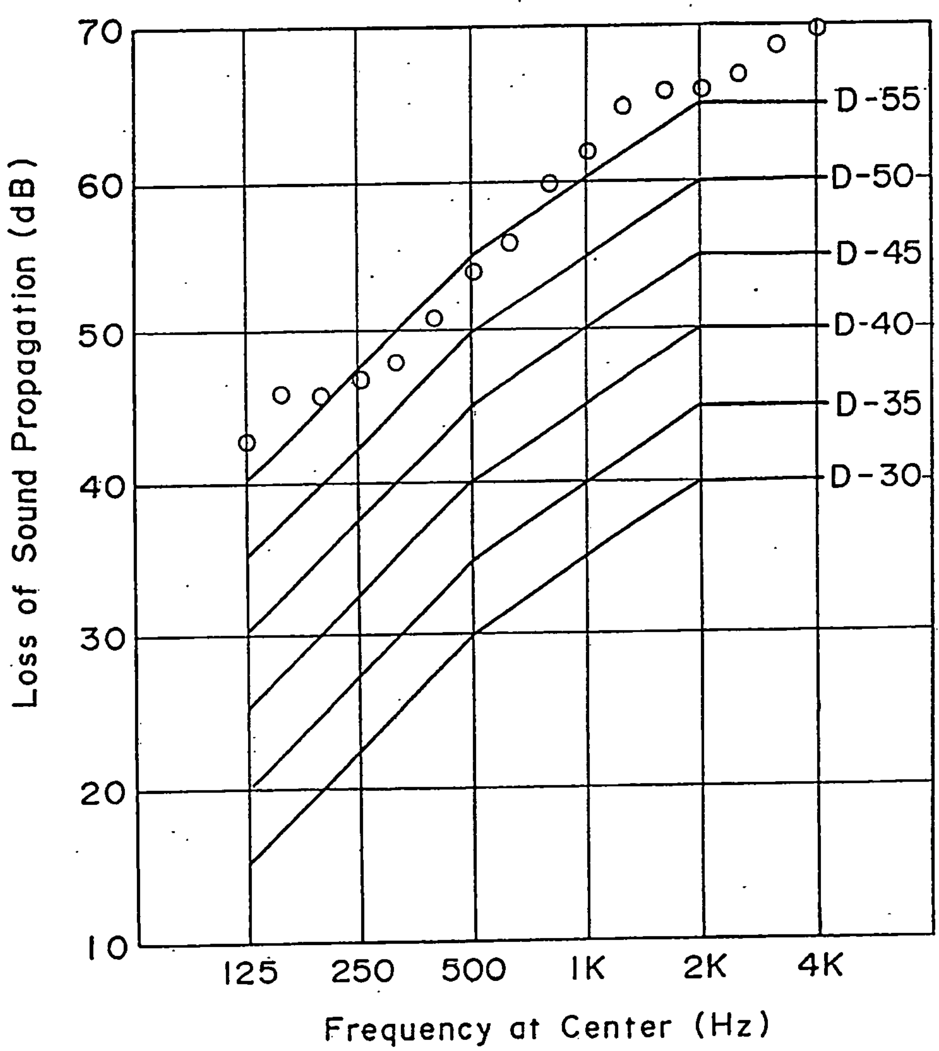
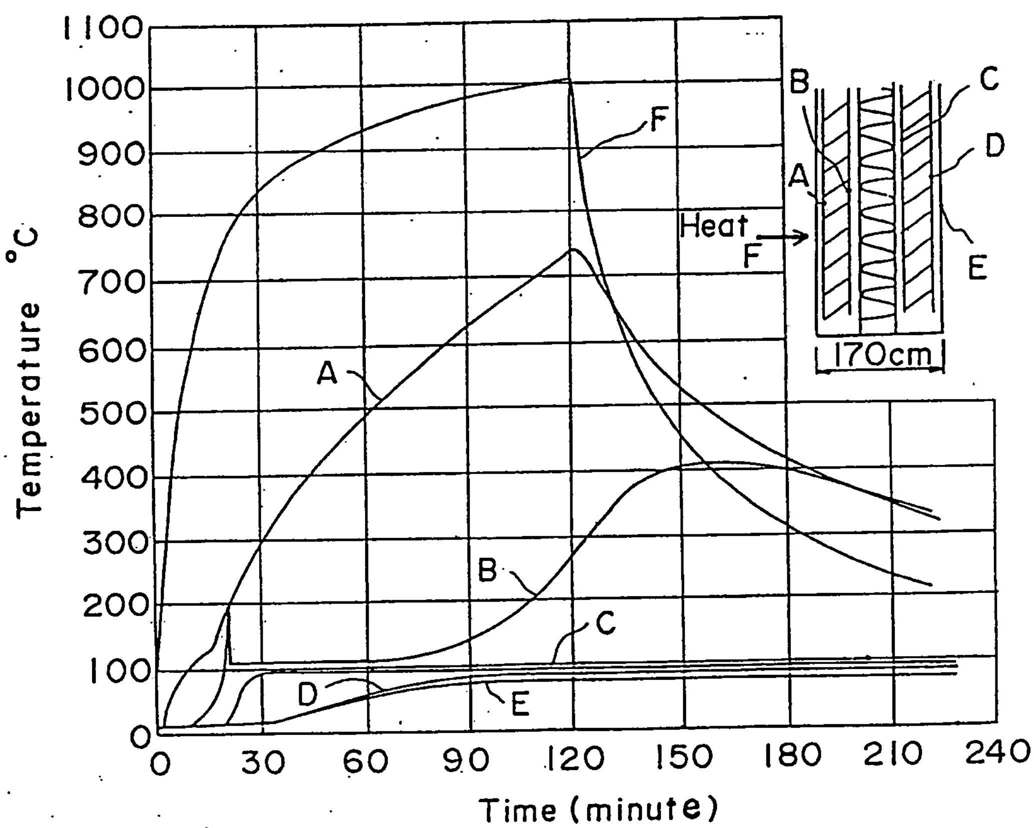


Fig. 24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1000
900
800
700
600
500
400
300
200
100
0
Temperature °C
0
30
60
90
120
150
180
210
240
Time (minute)
A
B
C
D
E
F
Heat
F
170cm

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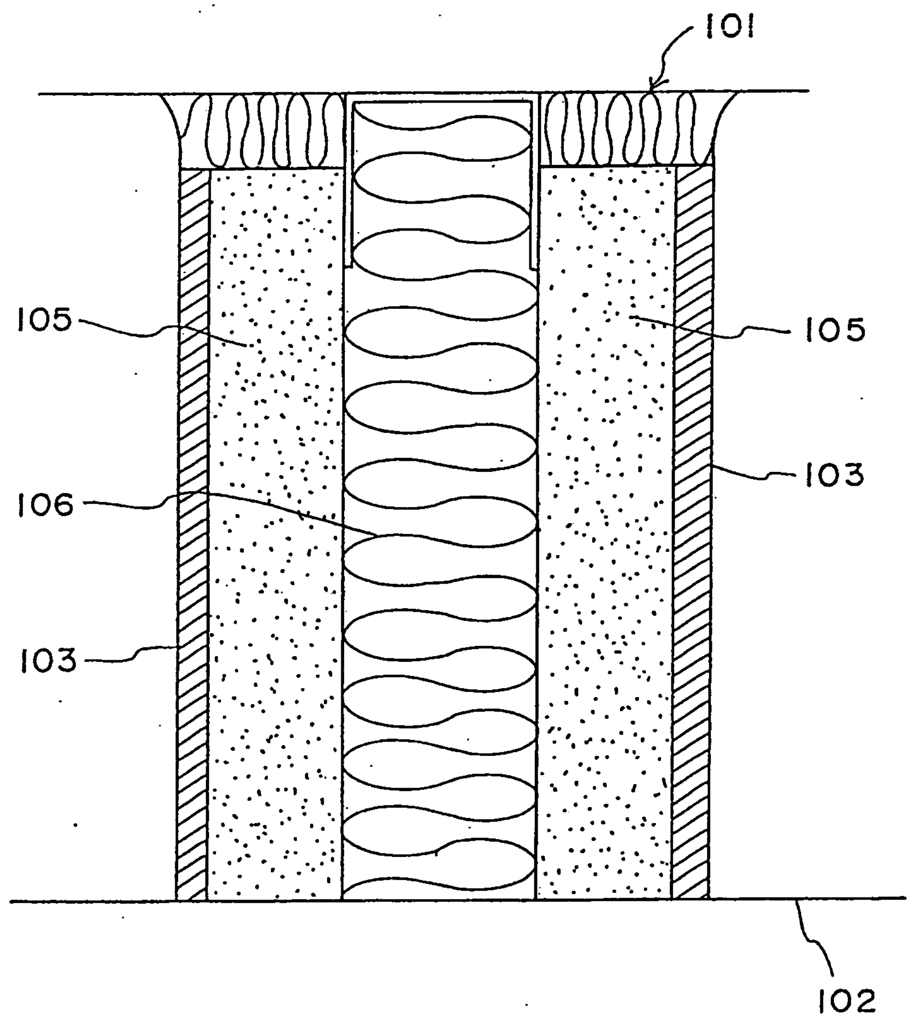
Fig. 25



SPECIFICATION

Wire mesh truss used to make panels as building wall elements

This invention relates to a light-weight panel used in indoor partition walls, one- and two-story structures and walls, and to a method of building a solid wire mesh truss complex wall applicable in walls for dividing one apartment from another (hereinafter referred to as "dividing walls"), or in partition walls requiring a sound-insulating property, which are primarily employed in high-rise apartment complexes.

PC panels, ALC panels and concrete blocks have long been used as materials for partition walls, buildings with few stories and walls. However, these materials generally are heavy and lacking in both sound-insulating and adiabatic properities, Hence there is a need for better building materials, To this end, light-weight and strong building materials have recently been developed by combining a number of different expandable synthetic resins, and methods of building structures using these materials have been proposed, Specifically, structural panels are made by sandwiching a rectangular block of expandable light-weight plastic between grid-shaped reinforcement trusses, strengthening the mutual joints by application of pressure, subsequently placing supporting reinforcing bars across the reinforcement grids and welding the reinforcing bars to the grids, Alternatively, structural panels are made by arranging grid-shaped reinforcement trusses in parallel with a prescribed spacing therebetween, followed by placing supporting reinforcing bars across these trusses and welding the reinforcing bars to form a solid truss, and then forming a layer of expandable synthetic resin in the intermediate portion of the solid truss. In either case, the structural panels are carried to a construction site where they are erected into a structure at a predetermined location of a building. This is followed by the spraying of concrete at the site.

A "mesh molding frame" method of construction has also been proposed as an improvement on the conventional construction method based on pouring concrete in board-type molding flasks. Specifically, a metal underlay such as a wire net is affixed to both sides of a hollow net frame, concrete is poured in the interior and then a surfacing mortar is sprayed and set.

The conventional building materials such as the PC panels, ALC panels and concrete blocks have none of the prescribed properties mentioned above, namely the properties of light weight, sound insulation and thermal insulation. The structural panel obtained by combining the expandable synthetic resin and the grid-shaped reinforcement trusses satisfies the requirement for light weight. However, since the method of fabricating the solid truss entails arranging a number of the grid-shaped reinforcement trusses in parallel side by side, laying columnar reinforcing bars across these trusses and then welding the same in order to obtain an integrated structure, manufacture requires both an extended period of time and machinery having a special mechanism and involving various process steps.

Specifically, to manufacture the solid truss, two parallel iron reinforcing bars are fitted into prescribed grooves in a die having grooves for receiving the positioned iron bars. Next, truss ribs of a prescribed length crossing the iron bars at a predetermined angle are dropped onto the iron bars and are precisely fitted into intersecting grooves on the die, after which welding is performed to form an integrated structure. Thus there is formed a single, continuous grid-shaped reinforcement truss composed of the two parallel iron bars and the truss ribs crossing these iron bars.

Next, the grid-shaped reinforcement truss is cut into predetermined lengths, a number of which are fed out in a state where they are juxtaposed in parallel. Supporting iron bars intersecting the whole of the two upper and lower parallel iron bars are laid across at right angles to the longitudinal direction and welding is performed from above and below to form an integrated solid truss.

Thus, manufacturing the solid truss requires the use of a special die and employs means in which the manufacturing process is interrupted before the next process is begun. The result is poor manufacturing efficiency overall. Furthermore, with the "mesh-type molding" method of construction, the net frame of a support column generally is weak. Therefore, even if there are columns and beams, it is always required to build wall reinforcing bars into the net frame. High cost is the result.

Plans for high-rise apartment complexes generally call for construction of dividing walls and partition walls by a PC construction method using RC, which is poured on site, or PC panels, ALC panels or concrete blocks serving as earthquake-resistant elements. However, these materials generally are very heavy, difficult to work with and costly.

With the recent trend toward ever taller buildings, it has become necessary to increase the non-load bearing capacity of dividing walls and lighten the same by a pure rigid frame structure, and various methods of constructing these dividing walls have been developed. More specifically, because of a reduction in weight at the upper part of buildings, simplification of the construction work and the use of large molding frames in high-rise apartment complexes, there is a trend toward reducing the weight of dividing walls by fabrication after the construction of the building proper.

One example of the prior art is a dividing wall illustrated in Fig. 25. Two steel fiber-

reinforced concrete panels 105, 105 each having a plaster board (PB) 103 adhered to one side are arranged to face each other in parallel relation at a dividing area between an upper floor 101 and a lower floor 102. A material 106 exhibiting excellent sound absorption, fire resistance and an adiabatic property, such as glass wool, is packed into the space between the panels 105, 105, thus constructing the dividing wall.

The conventional dividing wall employing these concrete panels is very heavy and difficult to handle. It also does not lend itself to labor reducing methods using robotization and is comparatively expensive. Moreover, the fact that the PB is adhered detracts from the durability and reliability of the dividing wall.

An object of the present invention is to provide a method of manufacturing a solid wire mesh truss which is light in weight and excells in fire resistance, thermal insulating property and sound insulating property, and which is structurally effective at the construction site and easy to handle.

Another object of the invention is to provide a light-weight panel using the abovementioned truss.

Still another object of the invention is to provide a method of manufacturing the abovementioned light-weight panel.

A further object of the invention is to provide a method of building a solid wire mesh truss complex wall capable of being carried into a construction site in a simple and easy manner and assembled with ease, and which makes it possible to produce a dividing wall at low cost in a short period of time.

According to the present invention, the foregoing objects are attained in the following manner:

Specifically, a light-weight panel of a solid wire mesh truss is manufactured by continuously forming two layers of wire mesh between which a predetermined spacing is maintained, forming the layers of wire meshes into a solid by joining them together by support ribs which are alternately different in a direction orthogonal to the longitudinal direction, cutting the solid to a predetermined length to form a solid wire mesh truss, sandwiching each of the layers of wire mesh between mortar layers, and inserting a core between the mortar layers.

A complex wall of a solid wire mesh truss comprises a sound absorber arranged at a dividing wall portion, and light-weight panels arranged and secured so as to f ixedly clamp the sound absorber. A method of building the complex wall comprises the steps of constructing each of the light-weight panels from a solid wire mesh truss, a light-weight mortar layer or light-weight expandable mortar layer formed on one side of the solid wire mesh truss, and an ordinary mortar layer formed on the other side of the solid wire mesh truss, forming a joint portion having a cut-in portion on the light-weight panel, and applying mortar to the joint portion at a job site.

Thus, the light-weight panel according to the present invention has the two spaced layers of wire mesh united into a solid by the support ribs alternately inclined in mutually opposing directions. This enables the core situated between the two layers of wire mesh to be readily held by the intersecting support ribs. The panel can also be carried into a construction site in a simple manner and readily assembled by hand without using a heavy-duty crane. It is therefore possible to fabricate a wall or the like in a short period of time and at low cost. Furthermore, since the mortar is sprayed on following the assembly operation at the location of a wall, the light-weight panel can be manufactured simply, quickly and inexpensively.

In accordance with the method of building a solid wire mesh truss complex wall of the present invention, the light-weight panel comprises the light-weight mortar and ordinary mortar, which have different specific gravities. This enables the sound insulation property to be improved. In addition, the panel can be easily carried in to the construction site using a small lifting crane and then assembled by hand in a simple manner, and the light-weight panels can be joined by mortar sprayed on at the site. This makes it possible to improve operability and lower cost. The invention also lends itself well to robotization so that a further reduction in labor can be achieved.

Since the solid wire mesh truss extends up to the corners of the light-weight panel, the panels do not easily break thus enabling assembly to be accomplished with ease even by inexperienced workers.

Since the mortar is sprayed on at the site, smooth, continuous surfaces can be obtained without seams at the joints. In addition, panels are not interconnected by iron reinforcing rods or an iron framework. As a result, sound does not propagate through the panels, thus providing an enhanced sound insulating property.

Another advantage of the invention is that durability and reliability are improved by virtue of the fact that the surface finish of the dividing wall is a cement-type finish.

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view showing a process for manufacturing a solid wire mesh truss according to the present invention;

Fig. 2 is a side view illustrating the configuration of support ribs in a solid wire mesh truss;

Fig. 3 is a view of a process for forming surfacing mortar on both sides of a solid wire mesh truss;

Fig. 4 is a side view for a case where a core material is packed between the layers of surfacing mortar;

Fig. 5 is a view of a process for forming a core in the middle of a solid wire mesh truss;

Fig. 6 is a view of a process in which cylindrical core rods are inserted longitudinally between separators orthogonal to the longitudinal direction of a solid wire mesh truss;

Fig. 7 is a view of a process for mounting a solid wire mesh truss with a core material between a slab and a ceiling, and for applying various layers of mortar;

Fig. 8 is a perspective view showing another embodiment of a process for manufacturing a solid wire mesh truss according to the present invention;

Fig. 9 is a view of a process for forming a core in the middle of the solid wire mesh truss;

Fig. 10 is a perspective view showing another embodiment of a process for manufacturing a solid wire mesh truss according to the present invention;

Fig. 11 is a side view for a case where cylindrical frames are inserted between parallel ribs and between provisional support bases of wire mesh;

Fig. 12 is a side view for a case where cylindrical frames serving as core members are supported solely by intersecting ribs;

Fig. 13 is a perspective view showing another embodiment of a process for manufacturing a solid wire mesh truss according to the present invention;

Fig. 14 is a side view illustrating the configuration of ribs in the solid wire mesh truss as well as metal underlays extending between the two sides;

Figs. 15 to 18 are views showing the assembled state of solid wire mesh trusses at the various portions of a walled building;

Fig. 19 is a view showing a method of filling an assembled solid wire mesh truss with mortar;

Fig. 20 is a longitudinal sectional view illustrating an embodiment of a solid wire mesh complex wall according to the present invention;

Fig; 21 is a horizontal sectional view showing the solid wire mesh complex wall according to the present invention;

Fig. 22 is a longitudinal sectional view illustrating another embodiment of a solid wire mesh complex wall according to the present invention;

Figs. 23 and 24 are graphs describing the results of experiments concerning sound insulation, heat resistance and thermal insulation; and

Fig. 25 is a longitudinal sectional view of a conventional dividing wall.

Figs. 1 to 7 illustrate a first embodiment of the present invention. A predetermined number of turntables 1 having steel wire wound thereon are arranged side by side and each pays out two upper and lower rows of wire 2, 3, as shown in Fig. 1. The paid out wires are arranged in lines and tensioned by a tensioner 4 and then enter a double mesh welding machine 5, where transverse wires 7, 8 from two turntables 6, 6′ intersect the wires 2, 3 and are welded thereto. Thus, two upper and lower layers of wire mesh 9, 10 are formed.

Next, the two layers of wire mesh are conveyed into a rib welder 12 where ribs 13, 13′ are welded thereto, thus constructing a length of solid wire mesh truss 14; The ribs 13, 13′ have two arrangements, as shown in Figs. 2(a), (b). In the configuration shown in Fig. 2(a), the ribs 13, 13′, which are inclined in mutually opposing directions, are alternately inserted in a direction orthogonal to the longitudinal direction of the solid wire mesh truss, and the wire meshes 9, 10 and ribs 13, 13′ are welded into an integrated body. In Fig. 2(b), different ribs 13, 13′ are inserted, so as to be arranged at positions that differ in the longitudinal direction, alternately in a direction orthogonal to the longitudinal direction of the solid wire mesh truss. The wire meshes 9, 10 and ribs 13, 13′ are welded into an integrated body.

The length of solid wire mesh struss 14 is then fed to a cutter 15 where it is cut into predetermined lengths, each of which is a single solid wire mesh truss 16.

As shown in Fig. 3(a), the wire mesh 9 on the one side of the single solid wire mesh truss 16 is embedded to an appropriate depth in a surfacing mortar filling a molding frame 17 having a depth equivalent to the thickness of the surfacing mortar to be provided on both sides of the truss.

Next, as shown in (b) of Fig. 3, the truss is removed from the mold after a prescribed period of curing and the above process is repeated for the wire mesh 10 on the opposite side [(c) of Fig; 3]. Thereafter, as shown in Fig. 4, a light-weight panel 20 is formed by inserting a light-weight core material 19 in the solid wire mesh truss 16 having the mortar provided on both sides thereof as set forth above.

Suitable examples of the core material 19 are a reed screen, glass wool, a cylindrical molding flask, light-weight expandable mortar, straw and rice hull-filled cement.

Figs. 5 and 6 illustrate examples of retaining the core material 19.

As shown in (a) and (b) of both Figs. 5 and 6, separators 27, 27′ are provided and arranged orthogonal to the longitudinal direction of the solid wire mesh truss 16, and the space between the separators is filled sufficiently by a reed screen. Since the solid wire mesh truss 16 having the core material 19 thus formed is very light in weight, it can be carried into a building site in a simple manner

without using a large transporter.

Next, for a case where the truss is to be used as a dividing wall, as shown in (a) to (d) of Fig. 7, a light iron channel 20 for fixing purposes is attached to a ceiling surface by being inserted or dry-fitted, and a light angle iron 22 for fixing purposes is fixedly secured to a ceiling at the slab in a similar manner. The solid wire mesh truss 16 is then erected in these channels and is secured by fixing bolts 23.

Thereafter, as shown in Fig. 7(c), a first layer of mortar 24 is applied by spraying, followed by the spray-application of a second layer of finishing mortar 25, as shown in Fig. 7(d). To facilitate workability at the construction site, mortar can be sprayed on only one side of the solid wire mesh truss in advance at the factory. The truss may then be transported to the site, installed between the ceiling and the slab and then have its remaining side sprayed with the first and second layers of mortar 24, 25.

Figs. 8 and 9 illustrate another embodiment of the present invention. A core member 11 integrally molded into a plate-shaped configuration or a row of cylindrical molding flasks is inserted between the wire meshes 9, 10 and is retained by a supporting base. The two layers of wire mesh and the core member are conveyed to the rib welding machine 12 for having the ribs 13, 13' welded thereto, whereby the length of solid wire mesh 14 is formed. Even if the supporting base is removed the core member 11 arranged in the wire meshes is retained sufficiently by the ribs intersectingly arranged on the inner side the wire meshes at predetermined positions without the core member 11 being specially welded.

The formation of the core member 11 is not limited to the foregoing method. Another method will now be described.

The method starts with the solid wire mesh truss 16 having the inserted ribs without the inclusion of the core member. As shown in Fig. 9(a), this truss 16 is set in a molding frame the depth whereof is equal to the thickness of the core member added to one-half a value obtained by subtracting the thickness of the core member from the thickness of the solid wire mesh truss. Then, as shown in Fig. 9(b), sand 18 is spread and leveled to attain a thickness which is one-half the above value. Next, light-weight expandable mortar 19 is cast onto the spread sand 18, as depicted in (c) of Fig. 9. At this time the height to which the mortar is poured is made to coincide with the peripheral height of the mold 17. After the light-weight expandable mortar 19 cures, the solid wire mesh truss 16 is raised vertically in order to be removed from the mold 17, as shown in (d) of Fig. 9.

It should be noted that the core member 11 of the solid wire mesh truss 16 is not limited to the light-weight explandable mortar described above. It is also possible to use rice hull-filled cement kneaded together with a cement paste capable of being integrally molded into a flat shape on the spread sand.

Figs. 10 to 12 illustrate still another embodiment of the present invention. A row of cylindrical reinforcement rods 11 arrayed in a planar configuration are inserted between the wire meshes 9, 10 via provisional support bases 27, 27' of a predetermined height. The two layers of wire meshes are successively conveyed into the rib welding machine 12 for having the ribs 13, 13' welded thereto, whereby the length of solid wire mesh 14 is formed.

The arrangement of the ribs 13, 13' is as shown in Fig. 11. Specifically, the ribs 13, 13', which are inclined in mutually opposing directions, are alternately inserted in a direction orthogonal to the longitudinal direction of the solid wire mesh truss, and the wire meshes 9, 10 and ribs 13, 13' are welded into an integrated body. Even if the provisional supporting bases 27, 27' are removed, the row 11 of cylindrical rods is retained sufficiently by the ribs intersectingly arranged on the inner side of the wire meshes at predetermined positions.

The core member constituted by the cylindrical rods 11 is not limited to the above example. As shown in Fig. 12, the cylindrical rods can be inserted successively from the side between the intersecting ribs of the solid wire mesh truss 14 emerging from the welding machine 12.

Figs. 13 to 19 illustrate yet another embodiment of the present invention. Two upper and lower metallic underlays such as wire netting 11, 11' (or only one of these underlays, namely the lower) are inserted between the wire meshes 9, 10. The two layers of wire meshes are successively conveyed into the rib welding machine 12 where the ribs 13, 13' are welded thereto, whereby the length of solid wire mesh 14 is formed.

The ribs 13, 13' have two arrangements, as shown in Figs. 14(a), (b). In the configuration shown in Fig. 14(a), the ribs 13, 13', which are inclined in mutually opposing directions, are alternately inserted in a direction orthogonal to the longitudinal direction of the solid wire mesh truss, and the wire meshes 9, 10 and ribs 13, 13' are welded into an integrated body. Even if the supporting base is removed the metal laths 11, 11' arranged on the inner side of the wire meshes are retained sufficiently by the ribs intersectingly arranged on the inner side of the wire meshes at predetermined positions without the laths being specially welded.

In Fig. 14(b), different ribs 13, 13' are inserted in a direction orthogonal to the longitudinal direction of the solid wire mesh truss and are arranged at alternately different posi-

tions in the longitudinal direction. The wire meshes 9, 10, ribs 13, 13' and metal laths are welded into an integrated body.

The length of solid wire mesh struss 14 is then fed to the cutter 15 where it is cut into predetermined lengths, each of which is the single solid wire mesh truss 16.

The solid wire mesh truss 16 is carried in to the building site to form a so-called panel-type structure not having columns and beams. Figs. 15 to 18 show the various configurations.

Fig. 15 is a plan view of a corner portion where walls meet. After solid wire mesh trusses 16, 16' are assembled manually in a simple manner without using a large crane, a wire mesh 29 serving as a joint is adhered to the corner portion from the inner and outer sides.

Fig. 16 is a plan view showing walls meeting in a T-shaped configuration. One solid wire mesh truss 16' is abutted against the intermediate portion of the other solid wire mesh truss 16, and wire meshes 29 serving as joints are adhered across both sides of the wire mesh truss 16' and one side of the wire mesh truss 16.

Fig. 17 is a longitudinal sectional view showing a wall meeting a slab. A solid wire mesh struss 16" for a slab having a metal lath on only one side is placed upon the solid wire mesh struss 16 for a wall, and a solid wire mesh 16 for a wall is erected again on the struss 16". In order to strengthen the force at which the wall and the slab are joined, a slab reinforcing bar 30 for the joint is provided in addition to the wire mesh 29.

Fig. 18 is a longitudinal sectional view showing a wall meeting a roof. As in the case where the wall and slab meet shown in Fig. 17, the slab reinforcing bar 30 for the joint is provided and a slab reinforcing bar 19 is arranged for strengthening the force at which the wall and roof parapet are joined.

To complete the building, mortar is prepared and sprayed on the solid wire truss structures of the walled buildings arranged as set forth above. The overall procedure is as shown in Figs. 19(a) through (c).

Specifically, an anchor reinforcing rod 31 is provided in the solid wire mesh struss 16 for a wall erected on a foundation structure. A pressure hose 32 is inserted into the truss and, as shown in (b) of Fig. 19, mortar is successively fed through the hose under pressure to fill the space betwaeen the metal laths 11, 11' with internal mortar 33. After strength is attained by curing of the internal mortar of the solid wire mesh truss 16, surfacing mortar is sprayed onto the outer surfaces of the wire mesh trusses 9, 10 and metal laths 11, 11'. This completes the framework of the building.

The introduction of the wall portion is as set forth above. As a matter of course, the casting of the mortar at the slab portion is performed to a required height on the lower-side metal lath 11 to surpass the upper-side wire mesh 9.

In accordance with this embodiment, the solid wire mesh trusses are joined with the minimum reinforcing rods and wire meshes for joining purposes and, moreover, there are no columns and beams. This enables the concrete to be cast with ease and excellent workability. Accordingly, walled buildings of one or two stories can be manufactured simply and in a short period of time with inexpensive materials.

Figs. 20 and 21 illustrate an embodiment of a method of constructing a complex wall using light-weight panels.

A dividing wall 112 comprises a material 113 such as glass wool exhibiting excellent sound adsorption, fire resistance and thermal insulating property, light-weight panels 115, 115 arranged to face each other from both sides of the glass wool 113, and joint portion mortar layers 116, 116 provided on the outer surfaces of the light-weight panels 115, 115 by application at the site.

The light-weight panel 115 is produced beforehand by precasting. A solid wire mesh truss 122 is constructed by welding truss ribs 121, 121' between two layers of wire mesh obtained by welding longitudinal wires 119, 119' and transverse wires 120, 120' into meshes. As shown in Figs. 20 and 21, the truss ribs 121, 121', which are inclined in mutually opposing directions, are integrally welded to the longitudinal wires 119, 119'. One side of the solid wire truss 122 thus constructed is fitted into a mold (not shown) having a predetermined depth. A layer of light-weight mortar or light-weight expandable mortar 123 is formed in the mold and allowed to cure for a predetermined period of time. A layer of ordinary mortar 125 is then formed on the light-weight mortar or light-weight expandable mortar 123, followed by the prescribed curing. The whole is then removed from the mold. In forming the layer of ordinary mortar 125, a molding flask is used to form a joint 126 which bites into the outer peripheral portion of the light-weight panel 115.

Let us now describe a method of bulding the solid wire mesh truss complex wall having the foregoing construction. A fixing channel 127 is secured to an upper floor 110, and a fixing channel 129 is secured to a lower floor 111. Thereafter, a material 113 such as glass wool exhibiting excellent sound absorption, fire resistance and thermal insulation is stacked between the channels 127, 129, the light-weight panels 115, 115 are arranged on both sides of the glass wool 113, and the light-weight panels 115, 115' are secured by a clamping member 130. This is followed by filling the space defined by the light-weight panels 115, 115 and the upper floor 110 with

a glass wool 131. Mortar 116 is then applied at the construction site to the joint portion 126 formed on the outer peripheral portion of the light-weight panels, whereby mutually adjacent light-weight panels are joined together. Finally, sealing is effected by a sealing member 131 to complete the dividing wall.

In joining the mutually adjacent light-weight panels together by the mortar 116 applied at the site, as shown in detail in Fig. 22, a wire mesh 133 is laid in the joint portion 126 formed by mutually adjacent light-weight panels 115A, 115B, after which the mortar 116 is applied at the site to join the panels 115A, 115B together with greater strength.

It should be noted that the material 113 exhibiting the excellent sound absorption, fire resistance and thermal insulation is not limited to glass wool, for it is also permissible to employ rock wool or the like.

Figs. 22 to 25 illustrate another embodiment of a method of constructing a complex wall using light-weight panels. A dividing wall 112 formed at a dividing section between the upper floor 110 and lower floor 111 comprises the material 113 such as glass wool exhibiting excellent sound adsorption, fire resistance and thermal insulating property, light-weight panels 116, 116 arranged to face each other from both sides of the glass wool 113 and formed from light-weight expandable mortar 114 and a solid wire mesh truss 115, and light-weight mortar layers 117, 117 sprayed onto the outer surfaces of the light-weight panels 116, 116 at the site.

The light-weight panel 116 is produced by precasting. The solid wire mesh truss 122 is constructed by welding truss ribs 121, 121' between two layers of wire mesh obtained by welding longitudinal wires 119, 119' and transverse wires 120, 120' into meshes. As shown in Fig. 22, the truss ribs 121, 121', which are inclined in mutually opposing directions, are alternately inserted in a direction orthogonal to the longitudinal direction of the solid wire mesh truss 115 and are integrally welded to the longitudinal wires 119, 119'. One side of the solid wire mesh truss 115 thus constructed is fitted into a molding trough (not shown) having a predetermined depth. A layer of light-weight mortar or light-weight expandable mortar 114 is formed in the mold and allowed to cure for a predetermined period of time. The whole is then removed from the mold.

One of the light-weight panels 116 is inserted into a fixing channel 122 arranged on an upper floor 110, and the panel is set in a fixing angle iron 123 arranged on the lower floor 111. After the panel is fixed by a locking bolt 125, the material 113 such as glass wool exhibiting excellent sound absorption, fire resistance and thermal insulation is stacked on the inner side of the panel. Next, the other light-weight panel 116 is secured to the corresponding channel 122 and angle iron 123 in the same manner as the other panel. A layer of light-weight mortar 117 is then formed at the site by spraying to complete the dividing wall.

Figs. 23 and 24 show the results of experiments performed to determine the sound insulating characteristic as well as the fire resistance and adiabatic characteristics of the dividing wall constructed as set forth above. The sound insulation experiment was performed twice. In both cases, D-50 (first class according to the sound insulation performance standards of the "Japan Architectural Society") was surpassed, as shown by the experimental results of Fig. 23.

The results of the fire resistance experiment are shown in Fig. 24. As indicated by curve F, one surface of the panel was heated for two hours at a temperature of 2000 F along a fire resistance test heating temperature curve, as stipulated by the Japanese Industrial Standards (JIS). Even after two more hours the temperature on the opposite side of the panel did not rise above 80°C, as shown by curve E. Thus the dividing wall of the present invention satisfies the requirements demanded by high-rise apartment complexes.

As many apparently widely different embodiments of the present invention can be made without departing from the scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

CLAIMS

1. A method of manufacturing a solid wire mesh truss intended to be the reinforcement portion of a light-weight panel for use as a building wall component, comprising the steps of:

continuously forming two layers of wire mesh between which a predetermined spacing is maintained;

forming the layers of wire meshes into a solid by joining them together by support ribs which are alternately different in a direction orthogonal to the longitudinal direction; and

cutting the solid to a predetermined length.

2. A method according to Claim 1, wherein the differing support ribs are inclined in mutually opposing directions.

3. A method according to Claim 1, wherein the differing support ribs are located at positions which differ in the longitudinal direction.

4. A method according to Claim 1 2 or 3, wherein a metallic net is mounted on the inner side of at least one of the wire meshes.

5. A method according to Claim 4, wherein the mounting of the net(s) is performed solely by the net being held by the intersection of the support ribs.

6. A method of manufacturing a solid wire mesh truss as claimed in Claim 1, substantially

as hereinbefore described with reference to, or as shown in any or all of Figs 1 to 7 of the accompanying drawings.

7. A method of manufacturing a light-weight panel for use as a building wall element, comprising inserting a core between the layers of wire mesh of a truss made by a method as claimed in any preceding claim, and thereafter sandwiching each of said layers of wire mesh between layers of mortar or cement.

8. A method according to Claim 7, wherein separators are arranged in the truss in a direction orthogonal to the rows of said support ribs and a core is thereafter inserted between each pair of adjacent separators.

9. A method according to Claim 7 or 8, wherein said core is spaced a prescribed distance from said layers of wire meshes and the core is held at a predetermined position.

10. A method according to Claim 9, wherein said core is molded by the steps of:

setting the solid wire mesh truss in a molding trough the depth whereof is equal to the thickness of the core added to one-half a value obtained by substracting the thickness of the core from the thickness of the solid wire mesh truss;

filling said molding frame with sand leveled to a height which is one-half said value;

charging layers of a mortar or cement onto the sand until the upper end of said molding frame is reached;

allowing curing for a predetermined period of time; and

removing the cured mass from the trough.

11. A method according to Claim 10, wherein the mortar or cement is light-weight expandable mortar or rice hull-filled cement.

12. A method as claimed in Claim 8, wherein the core is formed by inserting and arranging cylindrical reinforcement rods between the intersecting support ribs.

13. A method as claimed in Claim 12, wherein the cylindrical reinforcement rods are arranged in a direction orthogonal to the longitudinal direction of the truss while maintaining a predetermined distance between the rods and each of said layers of wire mesh.

14. A method according to Claim 7 or 8, wherein one or both of said mortar on cement layers is provided after the solid wire mesh truss, which has been cut to the predetermined length, is arranged on a wall portion of a building.

15. A method of manufacturing a panel as claimed in Claim 7, substantially as hereinbefore described with reference to or as shown in any or all of Figs 8 to 19 of the accompanying drawings.

16. A method of constructing a building, wherein there are used wall panels made by a method as claimed in any of Claims 7 to 15.

17. A method of building a solid wire mesh truss complex wall which includes a sound absorber, comprising the steps of:

constructing two light-weight panels each from a solid wire mesh truss as claimed in any of Claims 1 to 6, a light-weight mortar layer or light-weight expandable mortar layer being formed on one side of said solid wire mesh truss, and an ordinary mortar layer formed on the other side of said solid wire mesh truss; and assembling the two panels with a layer of sound absorbent there between.

18. A method according to Claim 17, which further includes forming a joint portion having a cut-in portion on one of the light-weight panels; and applying mortar to said joint portion at a building site.

19. A method as claimed in Claim 17 or 18, wherein said joint portion is formed in a layer of light-weight mortar or light-weight expandable mortar, and in a layer of ordinary mortar.

20. A method according to Claim 17, 18 or 19, wherein the sound absorbent is glass wool or rock wool.

21. A method of building a sound absorbent wall, substantially as hereinbefore described with reference to, or as shown in, Figs 20-21 or 22 of the accompanying drawings.

22. A wire mesh truss, light-weight panel or wall made by a method as claimed in any preceding claim.

23. A sound absorbent wall as claimed in Claim 22, having the properties shown in Fig 23 or 24 of the accompanying drawings.

24. A light-weight panel constituted by a solid wire mesh truss comprising:

two layers of wire mesh spaced apart a prescribed distance;

support ribs joining said two wire meshes into a solid;

mortar layers sandwiching each of said layers of wire mesh; and

a core interposed between said mortar layers.

25. A light-weight panel according to Claim 24, wherein said core is made of one or more of a reed screen, glass wool cylindrical rods or bars, light, weight expandable mortar, straw and rice hull-filled cement.

26. A light-weight panel constituted by a solid wire mesh truss according to Claim 24 or 25, which also comprises separators arranged in a direction orthogonal to rows of the support ribs on the inner sides of said layers of wire mesh;

and the core is retained by said separators a prescribed distance from said layers of wire mesh on the inner sides of said layers of wire mesh.

27. A light-weight panel constituted by a solid wire mesh truss according to Claim 25, wherein said core is made of one or more of a reed screen molded integrally into a planar configuration, glass wool, light-weight expandable mortar, straw, rice hull-filled cement and

a row of cylindrical rods or bars.

28. A solid mesh truss complex wall comprising:

a sound absorber arranged at a dividing wall portion;

light-weight panels arranged and secured so as to fixedly clamp said sound absorber; and

light-weight mortar layers sprayed onto the surface of each of said light-weight panels at a building site;

each of said light-weight panels comprising: a solid wire mesh truss; and

a light-weight mortar layer, the hardness whereof differs from that of the light-weight mortar layer sprayed at the job site, formed on one side of said solid wire mesh truss.

29. A solid wire mesh truss complex wall according to Claim 28, wherein said light-weight mortar layer having the different hardness is made of one or more of excelsior board, rock wool, light-weight expandable mortar and rice hull-filled cement.

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